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ABSTRACT

A study was conducted to discover what adult literacy students in Northern Ireland felt about a series of booklets that had been developed especially for such students and to find out the students' levels of comprehension of the materials--specifically to determine if comprehension depended on the subject's reading age. Twenty-one male students between the ages of 15 and 26.9, whose reading ages ranged from 6.3 to 13.1 years, participated in the study. Each student completed a two-part questionnaire for each booklet and an additional questionnaire after reading all booklets. The first part of the questionnaire elicited reactions to the booklets, while the second part gauged comprehension. The results of the first part of the questionnaire indicated that the students approved of the general physical presentation of the booklets and the content. Responses to the second part of the questionnaire indicated that comprehension did not depend upon reading age. The findings support the theory that comprehension is an interactive process--that a reader's prior knowledge plays a part not only in the perceptual aspects of the reading process, but also in the act of comprehension that these processes lead up to. The results also suggest that interaction between text and previous experience may assist in decoding, as students were able to find appropriate answers to questions of differing levels in a text which at face value should have been too difficult for them. (FL)

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DOES COMPREHENSION DEPEND ON READING AGE?

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Does Comprehension depend on Reading Age?

This paper was inspired by a project which was basically concerned with the evaluation of the acceptability and usefulness of a series of booklets produced in Northern Ireland, based on Northern Ireland material, for adult literacy students in Northern Ireland. The investigation had two main aims:

- i) To find out what the students thought of the stories - their content, layout, presentation.
- ii) To find out what their level of comprehension was; or in other words what they had got out of the stories.

The first part of the investigation was straightforward enough and it will be dealt with briefly since the findings are relevant to the second part, and they also serve as an introduction to it.

A series of eight booklets was commissioned by the Northern Ireland Adult Literacy Liaison group from the Ulster writer Sam McAughtry and was published in October 1980. The stories were also broadcast on BBC radio during the winter of 1980-81, and they were available on cassette for use by adult literacy students and their tutors throughout the province through the local education boards. It was felt by the Adult Literacy Liaison Group that an attempt should be made to ascertain the appeal of the stories for adult literacy students, whether the content was appropriate, and whether the language and level of comprehension demanded by them was suitable. This had never been done before on a formal basis for any of the materials used with adult literacy students. It was also hoped to gain some information about the uses made of the booklets in the teaching situation, for dissemination among tutors, and to discover the views of students about the general presentation of the stories. This information might, it was thought, be of assistance if it became possible to produce more local material.

Since this was a pilot survey and the number of participants was limited by various considerations, it was decided to select a group of subjects which would be as homogenous as possible. It is true that adult literacy students as a body cover a wide range of abilities, interests and ages and that they include both men and women from all walks of life and a larger scale survey could take account of this - but with a small survey there were many advantages to using a defined group. Another consideration was time, so a group which one would be sure of finding together at regular intervals was sought, and found, courtesy of the Prison Service.

The sample consisted of 21 subjects, all male, attending remedial literacy classes in two prison establishments. They were aged between 15.0 and 26.9 (mean age 18.9; SD 3.4). Their reading ages ranged from 6.3 - 13.1 (mean RA 8.6; SD 3.5). Non-verbal intelligence as measured on the Ravens Progressive Matrices was in the below average group with a mean around 80. (range of IQ 70-110). They were taught in groups of three to five. The number of class periods each week varied as did the number of periods spent with any one book in the series.

How typical were they of adult literacy students as a whole? Among ALS we still get a majority of men and there are various explanations offered for that. The average age is probably slightly higher than that of this sample, but there is also a fair proportion from this age group. Reading ages are similar to those of the group used in the study as far as we can tell. Non-verbal intelligence in this sample may have been lower than that of the average Adult Literacy Student. The ALS I included in my previous study (Whyte 1979) were closer to the normal mean and had an average IQ of 95. Most adult literacy students have classes once a week, and although some are now taught in groups, many still get individual tuition in a classroom setting. Still, with all these disadvantages it was thought worthwhile to go ahead.

Procedure

Each subject filled in a two part questionnaire for each of the booklets. This took place obviously over a period of weeks according as they read the booklets in class. Teachers and tutors were asked to give assistance in reading the questions if necessary, but not to give assistance in formulating the responses. They could assist in spelling if asked - but it was obvious from the replies that they were not asked in many cases. Students could consult the booklets while answering the questions. Part 1 consisted of questions on the general presentation of the stories and questions inviting the student to say what he liked or disliked about each story. Some questions were multiple-choice, and some were open-ended. Part 2 for each book consisted of five or six comprehension questions to be answered by the student with reference to the booklets and a cloze passage which was to be completed by them. An additional final questionnaire was administered when the whole series had been read.

Results of Part 1

1. Was the story boring, interesting or very interesting? Results were similar for this and the other multiple-choice questions in this part of the questionnaire for all the books, so they were pooled. The majority found the stories interesting or very interesting, with only three subjects saying that they were boring.
2. Did you hear it on radio, on tape, or both? The vast majority had heard it on tape; one on radio, and four on both.
3. Did you find it easy, possible, or difficult to read? The majority found the stories easy to read; six students said 'possible' and three found them difficult. This was interesting for as you will recall, the RA of the students was around 8, while the readability level of the material was around 10.

The use of tapes or radio may have helped.

4. Did you find the stories easy to listen to while reading the text? Most subjects found them easy to listen to and about 33% found it helpful while reading them.
5. Was the speed of reading too fast, too slow, or just right? The speed was right for the overwhelming majority with just two exceptions.
6. Did you find the print too big, too small or just right? The print was just right for most students, though 25% thought it was too big.
7. Did you find that the sentences were too close together, just right, or too far apart? There was practically unanimous consent that the spacing was just right.
8. Did you find the margins too wide, too narrow, or just right? Here again we had done a good job. A minority found them too wide (33%).
9. Would you have liked pictures? A slight majority were in favour of illustrations though an almost equal number said that they did not care. Only two students said that they would not like pictures.

Summary

These findings indicated that the general physical presentation of the stories found favour with these students. A few more illustrations would have been appreciated, and there was slight indication that the making of tapes was worthwhile.

What was liked and disliked about the stories?

All subjects were invited to say what they disliked about each story. Very few took advantage of this opportunity. It could have been because they were not accustomed to making judgements of this kind - in fact one of the teachers suggested this in a comment - and could not articulate criticism. The comments we did get included the following: 'all about Belfast'; 'too much the same thing'; 'a bit childish'.

They were also invited to say what they liked about each story on the appropriate questionnaire. Many of the items mentioned were specific details. A majority of the students responded fully to this question which in fact invited them to name three things they had liked. Many of the items mentioned were specific details, often humorous; others said that they could relate to the stories, that they brought back memories of the good old days, of the family atmosphere; others appreciated particular turns of phrase and mentioned these.

On the final questionnaire they were asked to say what they liked about the series as a whole, after a question asking whether they had in fact liked it. 90% said they liked the stories - only two had disliked them. The reasons included 'about where I live'; 'reminded me of my boyhood'; 'funny'; 'well-described'; 'true to life'; 'well worked-out'; 'told about hard times in the past'.

The findings from this section then, suggest that the subject matter was appropriate for this particular group, but the use of it by the teacher would obviously be a crucial variable. It would seem however that most of these students not only enjoyed reading the stories, and remembered specific episodes which gave them pleasure, but they learnt something about life in other times as well. This was elicited by another question and the replies included comments such as: 'life was hard in those days'; 'it was hard to find work then as now'; 'better housing and leisure facilities now'; 'not so many pawnbrokers shops today'; 'less money about them'; and 'family discipline was stricter'.

It is in order, I think, to wonder whether these responses with the high level of positive appreciation expressed, might be biased by a desire to please - to please the researcher, or the teacher. And, of course this is a possibility. Perhaps the judgements expressed by this sample did not represent their true reactions, nor would they represent the reactions of adult literacy students in general. On the other hand, the questionnaires were administered almost at third hand, so to speak, as they were passed from researcher to chief education officer, and from him to the teachers. The researcher did not meet either subjects or teachers at first hand. In the second place, the teachers were briefed to explain the purpose of the project to the students, and to emphasise the need to know what they really felt about the stories, and that we were not necessarily looking for approval, in fact that disapproval would be more helpful and constructive in a way. Thirdly, the teachers were asked to give their impressions on separate questionnaires of students' reactions to the books. These were very favourable and some teachers elaborated on this, saying that the explanation might lie in the subject matter, the environment or people described in the booklets, which were very different to those available in other books used by them in the classroom.

Comprehension

My second question gave me a lot more trouble. What was their level of comprehension? What were they getting out of the booklets?

It led in the first place to a number of subsidiary questions like:

What do we mean by comprehension?

What do we mean by level of comprehension?

How can it be measured?

So I looked over available comprehension/tests for some enlightenment since surely the people who dreamed them up would have worked all this out long ago. I found three main types of comprehension test:

- a) Those of the sentence completion type, where the subject selected a word or phrase from a number given to him, in order to fill a gap. Comprehension here seems to mean ability to understand words in context, and words out of context. Level of comprehension is defined with reference to age norms - or the number of people, usually children of a certain age, who can answer a certain item correctly of a number of items correctly. So there were no insights here into what might be expected at certain chronological ages or reading ages in terms of linguistic structures or type of vocabulary understood, since the criterion was quantitative.
- b) A second type of test is that based on the reading of a passage or a series of passages which become progressively more difficult in terms of linguistic structure and vocabulary although the principles according to which this is done are not explicit. Comprehension is assessed by means of questions asked when the passage has been read and the book is closed. Different types of questions are found, especially at levels beyond the basic level. Level of comprehension is again defined however in terms of the number of questions correctly answered - a quantitative rather than a qualitative result. We are not told for example whether poor readers - poor at decoding - may have comprehension abilities beyond that normally expected of people with low decoding skills because the higher level questions are not usually asked at the lower decoding levels as it is assumed that the two go together. Another major drawback is the confounding with recall which happens with this type of test. I like to think that comprehension of written material is not so totally tied up with ability to recall as these tests suggest.

The third type of test is like the Nelson-Denny or the Edinburgh. Again a series of passages is used, becoming more difficult both syntactically and semantically as one progresses through the series. This time however, the confounding with recall is avoided by having the questions on the same page as the passage so that reference may be made to it. This also enables various strategies to be used such as reading the questions first and then seeking the answers. Although the questions are in this case again of different types, tapping different levels - of which more later - the level of comprehension is arrived at quantitatively, by calculating the number of correct answers.

So I found really no guidelines - unlike for example if I had been looking at levels of achievement in maths where certain principles usually have to be grasped before others and this can be easily tested. It was not a foregone conclusion for example that my sample, if it used the word-completion type of test, would have mastered, say, three-letter words before four-letter words as far as meaning was concerned; so I did not know whether they would be expected to be able to insert or supply a three-letter word before a four-letter word. How many questions should they be expected to answer at age 18 with a reading age of 8? Would the type of question have any bearing on the outcome? Would the content of the text have any bearing on the outcome? Would a finding that they could perhaps x% of the questions that I might compose tell us anything about their level of comprehension?

It was time to look further - this time at theories of comprehension.

Looking at comprehension it seemed to me that it had been approached from four angles:

1. A view of comprehension set in the context of language representation in general. Important people here would be for example Schank (1972) with his notion of a conceptual dependency network which is a representational schema that captures the conceptual elements of a linguistic string and the manner in which those elements relate to each other. In conjunction with overall memory structure, these networks establish what a linguistic string really means. A second important person would be Anderson (1977) who has applied schema-based theories of language representation to reading. According to him a schema can be conceptualised as a generic data structure that contains slots or place-holders for frequently experienced events. They facilitate the memory representation process and they fill in missing content which would be essential for complete understanding. When information is encountered for which there is no existing data base, representation and comprehension are difficult and laborious. In this event, a data structure must be fabricated from what may be ill suited existing structures.

This undoubtedly adds to our understanding of what may be involved in comprehension but an empirical investigation based on these theories was not possible under the circumstances of this project.

2. Those who look to the text first, like Kintsch (1979), or Perfetti & Lesgold (1980), as playing a major part in comprehension. They claim that text coherence or the amount of argument repetition in the text is directly related to ease of understanding; ie. the text will be more easily understood if the incoming arguments can be related to knowledge already in memory, whether this knowledge has come from earlier parts of the text itself, or from previous experience on the part of the subject.

Again this could be relevant but the text was already written and could not be manipulated, so this approach could not be availed of.

3. A logical analysis of comprehension such as that by Barrett (1968). In this taxonomy he distinguishes levels of comprehension without reference to prior experience or text variables. These levels are: literal, reorganisational, inferential, evaluative and appreciative. This provided insights into areas which could perhaps be explored in the current study.
4. People who have looked primarily at the skills which might be involved in comprehension no matter what the level, the type of text, or the amount of prior knowledge. Davis's review of theories of comprehension and of research (1971) revealed a range of competencies including knowledge of and recall of word meanings, the ability to grasp detailed facts, to follow the structure of a passage, to identify a writer's techniques, to recognise a writer's purpose, attitude, tone, and mood, and to consider a passage objectively without taking into account personal feelings. Lennon (1960) reviewed some 30 empirical studies on comprehension and his conclusions paralleled those of Davis.

There is however controversy about whether comprehension should be seen as a cluster of mental abilities or a single skill. Not everyone agrees with Davis. Lunzer, Waite and Dolan (1979) came down on the other side and say that comprehension is a single skill, but that it can operate at two levels:

- i) making sense of what is read
- ii) penetrating beyond the verbal forms or text to the underlying ideas, comparing them with what one already knows, and also with one another, picking out what is essential and revising previous conceptions.

Royer and Cunningham (1981) carry this synthesising effort a stage further still. They suggest that comprehension is an interactive process and they propose what they call a minimal principle of comprehension which is that the act of comprehension entails an interaction between an incoming linguistic message and the comprehender's world knowledge. Elkind was also going along the same lines in 1974, when he proposed that reading is more than a passive process of decoding written symbols. It should, he said, be regarded as a constructive activity, for meaning is not inherent in written or spoken words but is given to them by the reader or listener who interprets them within his own storehouse of knowledge. The silent reader gives meaning to the words he reads by relating them to the conceptual system he has constructed in the course of his own development.

My task was slightly clearer now. Instead of asking what the level of comprehension was I should be asking whether the students were able to construct meaning from the text of the booklets, and what kinds of meaning they were able to construct.

Had anyone done this before with adult literacy students? Since reading is now primarily seen by most people as the communication of meaning, you would think that an appraisal of how good adult literacy students were at extracting meaning from print would have been a priority when adult literacy planning and programming became fashionable. There was in fact a good deal of work done on decoding skills, and on teaching methods for these at the time, and many a subskill was analysed, but I could find nothing at all on comprehension even in the major pieces of government sponsored research, which appeared in 1979-1980, on the impact of the adult literacy schemes in Britain. Sticht in the USA has produced a substantial body of research with adult literacy students, mostly in occupational settings, but he does not go into processes or models of comprehension, and his findings are very situation specific - he is only interested in productivity and job efficiency. Fisher (1981) analysed responses to a functional literacy assessment schedule but he was not looking at processes or levels of comprehension either but rather at types of errors so as to construct a model of question-answering and to categorise errors into process-oriented or deficit-oriented; (in other words whether they were due to absence of skills or knowledge or simply due to carelessness).

Ruddell (1978) provided a framework within which to compose questions. He saw comprehension levels as varying along a continuum from straight recall of information to utilisation of information in new situations. The factual level is related directly to factual content and to comprehend material at this level requires identification and recall of information. An important distinction between this level and the interpretive level and applicative levels which follow is that at the factual level the reader is not required to cognitively manipulate or to control the details, sequence of ideas and so on. The response may include an estimation of value at a very basic level, but requires no substantiation or support for yes or no answers. At the interpretive level however, the reader or listener must modify or manipulate the content by analysing, reconstructing, and inferring relationships using skill competencies such as sequence of details, cause and effect, main idea and prediction of outcome. Valuing at this level may reflect inferences based on personal experiences and judgement, character trait identification and identification of the author's motive.

The third or applicative level did not apply in the current study.

This framework was adapted and questions of these types were devised:

i) Straight extraction of fact:

- What was Sam's first job
- Name the two horses that he backed and that won

These could be called questions on the factual level, or literal level.

ii) Explanation of words and of turns of phrase:

- What do these words mean: bachelor, jetty, selection, corn
- What did Sam mean when he said to Isobel: Is your head cut?

These depended partly on prior knowledge being brought together with material from the text, what Lunzer & Gardner (1979) call Inference from Multiple Strings.

iii) Reorganisation of information from the text:

- mention three things he liked about his job
- why did his parents let him give up his job

iv) bringing in information from elsewhere - prior knowledge:

- what did the ships bring from Australia to Belfast,
- What does a pawnbroker do?

- v) Constructive/affective/evaluative questions which involved not simply information but personal experience which has been reflected on, experience involving things like social interaction, motivation, attitudes and feelings.

There was one question of this type for each story :

- Why do you think he called himself captain?
- Why do you think Mrs. McClean was not laughing when she came in with Billy?

Here is an example of the range of questions for one story - Question from Story 5

1. What were the names of:
 - i) The two horses that Sam backed and that won?
 - ii) His mate?
 - iii) His sister?
2. Were the boys pleased when they won the money?
How do you know?
3. Why do you think they felt like that?
4. What did Sam mean when he said to Charlotte: 'You couldn't get them around your neck'?
5. Why do you think Mrs. McClean was not laughing when she came in with Billy?

The range was similar for every other story.

The students had in most cases both listened to and read the story. They were allowed to consult the booklets while responding. The teachers could read the questions with them but were asked not to help in the formulation of responses. The task was basically one of extraction of meaning at different levels. The students could ask for help with spelling but many obviously didn't.

The first four types of questions were easy to score - answers were either right or wrong though the skills involved were slightly different. The rate of correct response for each of these four types was around 80%. This was interesting for as I mentioned above the reading age of the students was around 8.0 and the readability level of the material around 10.0. This result indicated that given suitable material, the skills needed to answer these questions were present in them and that they were quite capable of using those skills.

In scoring the responses I was looking at:

- a) whether the students would respond more completely or better to some types of questions than to others
- b) whether the level of response was related to their reading age as measured by the Burt
- c) whether the level of response was related to IQ as measured by the Ravens.

Very low correlations were found between scores on these questions and reading age (-.014 and with IQ (.09).

Mistakes tended, in Fisher's jargon, to be process related rather than deficit related - in other words due probably to carelessness. For example, reversing the requirement like saying what comes from Belfast to Australia, instead of the other way around; or what Sam disliked about his job, instead of what he liked; or omitting questions altogether.

The fifth type of question was another matter. Taking the responses to any one question - e.g. those to the question for Book 4 - it seemed to me that some replies were on a higher level than others.

Replies to question 5, Story 5

- Because she was angry.
- Because she was mad.
- She was in a bad mood.
- Billy had told her Sam gave him the beads
- She thought they had stolen the beads.

But how should they be scored? First I had them rated by an independent judge and a substantial measure of agreement was found. Possible reasons why the better replies were better were then discussed. On one level of course each answer is correct, but the qualitative differences were there and it was decided that those which brought in more knowledge of the world and evidence of having reflected on it were on a higher level for they suggested that the text was making even more sense to that particular reader, in that he was bringing more experience to it and probably getting more out of it. Only 46% of the responses to these questions were found to score at the higher level. Again there was no significant relationship with IQ nor with reading age, though it's interesting to note that the correlation with the responses to the other questions (.11). Some students scored high on one or two of these questions but they were not consistent. All the students obviously knew that this was a possible way in which to approach a text, a constructive approach, to use the current jargon, but they did not use it consistently, nor did it correlate with the other measures.

Now if comprehension levels are arranged vertically and in parallel with reading ages derived from level of skills, this should not have been the result; nor should it have been the result if comprehension levels are independent of outside experience and content of the text. The better readers as assessed by the word reading test, should have had higher comprehension scores, and they should also have scored more on the more advanced levels of comprehension. If comprehension level depended on reading age, then probably very few of these students would have got beyond the factual level of comprehension, but they all had - questions requiring inference from multiple strings had an 80% correct response rate; since their measured non-verbal IQ was not high, and their reading ages were below the readability level of the material, we have another problem: that of apparent measured language complexity which did not present difficulties. So what might their level of comprehension have depended on? Well, since neither measured IQ nor measured reading age seemed to have been related, the other two possibilities are those suggested by the first two approaches to comprehension which I mentioned above - the prior experiences of the students concerned and how they were organised in memory, obviously quite adequately even for those students with below average IQ: and the actual content and organisation of the text. The earlier part of this study had found that the booklets had appealed to the students because of their past experiences and because of being set in a familiar environment and using familiar language patterns. Some of the conditions for comprehension proposed, for example, by Kintsch were thereby fulfilled eg. of textual cohesion between the readers' own experience and the text.

Support seems to be given here for the theory that comprehension is an interactive process and that the minimal principle of comprehension advanced by Royer and Cunningham may apply in both its forms - that a reader's prior knowledge plays a part not only in the perceptual aspects of the reading process, but also in the act of comprehension which is led up to by these processes. Indeed this small study suggests that the process may also work in reverse; that the interaction between text and previous experience which results in comprehension may also lend assistance in decoding - for here, students were able to find appropriate answers to questions of differing levels in a text which on its face value should have been too difficult for them.

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